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10/563,126

01/03/2006

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EXAMINER

HODGE, ROBERT W

ART UNIT

PAPER NUMBER

1729

MAIL DATE

DELIVERY MODE

11/16/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/563,126 | Applicant(s) TAKAHASHI ET AL. | |
| | Examiner ROBERT HODGE | Art Unit 1729 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-3,6,8,9,11 and 12 is/are pending in the application.
- 5a) Of the above claim(s) 8 and 9 is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-3,6,11 and 12 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks, filed 9/30/11, with respect to the rejection of claims 1-3 and 6 under 35 U.S.C. 102(b) as being anticipated by JP 2002-358963 have been fully considered and are persuasive. The rejection of claims 1-3 and 6 under 35 U.S.C. 102(b) as being anticipated by JP 2002-358963 has been withdrawn.

The remainder of applicant's arguments filed 9/30/11 have been fully considered but they are not persuasive. The Examiner acknowledges applicants submission of evidence with a declaration under 37 CFR 1.132 in an attempt to overcome the grounds of rejection under 35 U.S.C. 103(a). As will be shown below there are some inconsistencies in the data provided in the declaration filed 9/30/11 and the data in the instant specification. Below is a side-by-side comparison of Table B found on page 4 of the declaration filed 9/30/11 and Table 2 found on page 21 of the instant specification:

[0058] [TABLE 2]

| | Zr Content (mole %) | EC Content of Electrolyte Solvent (VOL. %) | Capacity Retention (%) | | |
|-------------------------------------|---------------------|--|------------------------|------------------|------------------|
| | | | after 100 Cycles | after 300 Cycles | after 500 Cycles |
| Battery B1(A1) of Present Invention | 0.5 | 10 | 94.6% | 91.0% | 87.9% |
| Battery B2 of Present Invention | 0.5 | 20 | 93.2% | 87.8% | 77.2% |
| Battery B3(A2) of Present Invention | 0.5 | 30 | 92.4% | 49.9% | - |
| Battery B4 of Present Invention | 1.0 | 30 | 92.0% | 24.7% | - |
| Comparative Battery Y1(X1) | 0 | 30 | 28.5% | - | - |
| Comparative Battery Y2 | 0 | 10 | 7.8% | - | - |

Table 3

| | Zr Content (mole %) | EC Content of Electrolyte Solvent (VOL. %) | Capacity Retention (relative value) | |
|-------------------------------------|---------------------|--|-------------------------------------|------------------|
| | | | after 100 Cycles | after 300 Cycles |
| Comparative Battery Z1 | 0.5 | 5 | 90.9 | 87.6 |
| Battery C1(B1) of Present Invention | 0.5 | 10 | 100 | 100 |
| Battery C2 of Present Invention | 0.5 | 15 | 103.1 | 107.3 |
| Battery B2 of Present Invention | 0.5 | 20 | 98.5 | 95.5 |
| Comparative Battery Z2 (B3) | 0.5 | 30 | 97.8 | 54.8 |

As can be seen above the data for B1 (EC content of electrolyte at 10%) is inconsistent. Table B shows 100% for both after 100 and 300 cycles, whereas Table 2 shows 94.6% after 100 cycles and 91% after 300 cycles. The data for B2 (EC content of electrolyte at 20%) is also inconsistent. Table B shows 98.5% after 100 cycles and 96.5% after 300 cycles, whereas Table 2 shows 93.2% after 100 cycles and 87.8% after 300 cycles. Furthermore it is unclear how the data for C2 can be greater than 100%. Applicants are invited to call the Examiner to schedule an interview to discuss the above inconsistencies.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-3, 6, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over by U.S. Pre-Grant Publication No. 2004/0121234 hereinafter Le in view of U.S. Patent No. 5,030,528 hereinafter Shen.

With regards to claim 1, Le teaches a nonaqueous electrolyte secondary battery which has a positive electrode containing lithium cobalt oxide as a positive active material, a negative electrode containing a graphite material and a nonaqueous electrolyte solution containing ethylene carbonate as a solvent and which is charged with an end-of-charge voltage of at least 4.3 V, said battery being characterized in that a zirconium-containing compound adheres onto particle surfaces of said lithium cobalt oxide (abstract and paragraphs [0008]-[0009] and [0026]-[0047]).

Art Unit: 1729

Le does not teach the amount of ethylene carbonate present in the electrolyte solution.

Shen teaches a lithium secondary battery wherein the nonaqueous solvent mixture comprises 10-20% by volume of ethylene carbonate (abstract and column 2, line 62 - column 3, line 4).

At the time of the invention it would have been obvious to one having ordinary skill in the art to regulate the amount of ethylene carbonate present in the electrolyte solution such that it is between 10-20% by volume in Le as taught by Shen in order to provide a lithium secondary battery having an improved electrolyte that will have lower internal impedance, longer cycle life, higher energy density, low self-discharge and a longer shelf life (abstract of Shen). If a technique has been used to improve one device (regulating the amount of ethylene carbonate present in the electrolyte solution such that it is between 10-20% by volume), and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way (providing a lithium secondary battery having an improved electrolyte that will have lower internal impedance, longer cycle life, higher energy density, low self-discharge and a longer shelf life (abstract of Shen)), using the technique is obvious unless its actual application is beyond his or her skill. See MPEP 2141 (III) Rationale C, KSR v. Teleflex (Supreme Court 2007).

With regards to claims 2-3 and 6, Le further teaches that the zirconium compound is in an amount of less than 1 mole % but not less than 0.1 mole %, based

Art Unit: 1729

on the total mole of cobalt and zirconium that has a particle diameter from 100 nm to 3 μm (see citations above).

With regards to claims 11 and 12, Le teaches in paragraph [0042] that the metal oxide particles are adsorbed on the surface of the cathode active material (i.e. does not exist as a film or shell covering the core of the active material) and that the surface is preferably partially covered with the metal oxide particles without affecting the transport of lithium to and from the active particles. Le teaches the claimed invention except for expressly stating “at least 80% of the particle surface being left uncovered”. It would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the amount of metal oxide particles adhered to the cathode active material particles in order to prevent a film or shell from forming which would prevent the transport of lithium to and from the active particles and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See MPEP 2144.05.

The examiner notes that claims 2-3, 6, and 12 are product-by-process claims. “Product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps”. See MPEP § 2113. Therefore because all of the structure recited in claims 2-3, 6, and 12 is present in the Le reference, claims 2-3, 6, and 12 are included in the above 103(a) rejection.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT HODGE whose telephone number is (571)272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ula Ruddock can be reached on (571) 272-1481. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1729

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert Hodge/
Primary Examiner, Art Unit 1729